

REMARKS

Claims 1-31 and 34-37 were pending in the present application. Claims 1-20 and 36-37 were canceled. Claims 23-24, 27-29 and 34 were amended. Claims 38-44 were added. Accordingly, claims 21-31, 34-35, and 38-44 are now pending in the present application.

Claims 1, 6, 11, 16, 21, 31 and 34-37 stand rejected under 35 U.S.C. 102(b) as being anticipated by Christiansen (U.S. Patent No. 5,915,253) (hereinafter 'Christiansen'). The Applicant respectfully traverses these rejections.

Claims 2-5, 7-10, 12-15, 17-20 and 22-30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Christiansen in view of Napolitano et al. (U.S. Patent No. 6,219,693) (hereinafter 'Napolitano'). The Applicant respectfully traverses these rejections.

The Applicant discloses at page 8 line 28 through page 9 line 2 "The files in a given directory may be allocated to different volumes based on the storage characteristics desired for each file, but the files may still logically reside in the same directory." The Applicant also discloses at page 6 lines 18-19 "File system 110 may include entries for each file regardless of which storage device it is physically stored on." Further, the Applicant discloses at page 7 lines 1-2 "a logical volume may be a single storage entity or multiple storage entities, configured to appear like a single entity to the file system." Still further Applicant discloses at page 9 line 28 – page 9 line 2 "The files in a given directory may be allocated to different volumes based on the storage characteristics desired for each file, but the files may still logically reside in the same directory." (Emphasis added).

Accordingly, Applicant's claim 21 recites a data storage system comprising
"a first volume having a first storage volume characteristic;
a second volume having a second storage volume characteristic; and

a computing node coupled to said first volume and said second volume, wherein said computing node includes a file system for identifying a first file stored on said first volume and a second file stored on said second volume; wherein said file system includes a directory structure having a directory which includes a first entry corresponding to said first file and a second entry corresponding to said second file." (Emphasis added).

The Examiner asserts that the Applicant's "volume characteristics" reads on Christiansen's "objects includes metadata." In addition, the Examiner asserts that "a directory structure" reads on Christiansen's "index into a hash table." The Examiner also asserts that the Applicant's "a directory allocated to said first volume and said second volume, wherein said directory includes an entry corresponding to a file maintained by said file system," wherein "volume" reads on Christiansen's "class" and that Christiansen discloses an ID of a parent directory indicating all child directories are tied up to one umbrella directory. Further, the Examiner asserts that "and wherein said entry includes a field containing a volume identifier indicative of which of said first or said second volumes said file is stored within" reads on Christiansen's "each object is owned by particular volume".

The Applicant respectfully disagrees with the Examiner's piecewise characterization of Christiansen.

Christiansen is directed to a method and system for implementing objects in a storage system. At col. 2, lines 22-23 Christiansen discloses

"Storage system 24 includes object table 40 which contains a plurality of references to in-memory objects. Object table 40 in a preferred embodiment is a hash table. The index into object table 40 for any particular object can be determined as a function of a unique identifier associated with the object. Object reference 41 refers to object 26. Object 26 includes class reference 28 which points to the class from which object 26 was instantiated. Class reference 28 points to file class 60 indicating that object 26 is a file object. By following class reference 28, storage system 24 can invoke the methods associated with object 26, including those of its parent classes, through class method references 63, 70, 76 and 80. Object references 42 and 43 similarly refer to file objects 30 and 34, respectively. Thus, to interact with object 34, storage system 24 uses the

unique identifier associated with object 34 (which is preferably included in the object access request by convention) to index into object table 40 to obtain object reference 43.

In addition, at col. 2, lines 22-23 Christiansen discloses “It is yet another object of this invention to provide a method and system for allowing the run-time registration of new classes which define the attributes and methods of an object instantiated from the class.”

In addition, at col. 10, lines 31-34, Christiansen discloses

“According to one embodiment of this invention, each object is owned by a particular volume object. The description of the inherited class methods provided below assumes that each object is owned by a volume object.”

Christiansen also discloses at col. 12, lines 8-32

“FIG. 7 is a schematic diagram of volume object 180 as it is represented on persistent storage according to one embodiment of this invention. A volume object includes volume metadata as well as volume object data. Volume metadata 192 includes volume data reference 194 which is a pointer to the volume object data associated with volume object 180. A volume object's data comprises the objects owned by that volume. Directories of the names of objects can be implemented in a container object which maintains the name of the objects of a particular directory in a hierarchical tree. For example, volume data 196 includes object 26, object 30, and object 34. Thus, by maintaining a reference to a particular volume one can access each object associated with that volume. An object includes metadata as well as object data. For example, for a file object, metadata might include the file size, file creation time, and last access time. The object data can comprise the actual data associated with the object, which can differ from object to object, but can comprise for example a word processing document. Thus, the metadata of object 26 includes a data reference 200 which points to object data 201 on persistent storage device 179. Similarly, data reference 204 of object 30 points to object data 206. Data reference 208 of object 34 refers to object data 209.”

From the foregoing, the “index into the hash table” is used internally by the storage system, not a user. Thus, since a directory by its common computer use is a container used to organize files and folders into a hierarchical tree, a directory as recited

in claim 21, does not read on “an index into the hash table” as asserted by the Examiner. In addition, “object includes metadata” refers to “metadata might include the file size, file creation time, and last access time storage. Accordingly, “storage volume characteristics” does not read on “object includes metadata”.

It is apparent that Christiansen discloses a system in which a volume object is associated with one persistent storage (e.g., persistent storage device 179). It is also apparent that each volume object includes volume object data and volume metadata. It is also apparent that each object is associated with a particular volume. It is further apparent that a container object may include directories of the names of objects of a particular directory in a hierarchical tree.

However, the Applicant respectfully submits that it is **not** apparent nor does Christiansen teach or suggest that a volume object may be associated with more than one persistent storage. It is also **not** apparent that any single directory in Christiansen may list objects associated with more than one volume object. To the contrary, the Applicant can find no reference in Christiansen whatsoever to more than one persistent storage being used in any example or illustration. Furthermore, each and every object (e.g., object 26, 30 and 34) owned by a volume object in Christiansen is owned by the same volume object (e.g., volume object 180). Thus, the Applicant respectfully submits that since Christiansen does not teach or suggest more than one persistent storage being associated with any given volume object, Christiansen could not possibly teach a directory that includes files (objects) which may be stored on more than one volume. Accordingly, simply because a volume owns each object, does not imply nor does it teach that a single directory may list a file that may belong to either a first volume or a second volume.

Thus, Christiansen does not teach or disclose “a computing node coupled to said first volume and said second volume, wherein said computing node includes a file system for identifying a first file stored on said first volume and a second file stored on said

second volume; and wherein said file system includes a directory structure having a directory which includes a first entry corresponding to said first file and a second entry corresponding to said second file” as recited in Applicant’s claim 21.

Napolitano is directed to a file array storage architecture having file system distributed across a data processing platform. Applicant can find no reference in Napolitano to any directory structure much less “file system for identifying a first file stored on said first volume and a second file stored on said second volume; and wherein said file system includes a directory structure having a directory which includes a first entry corresponding to said first file and a second entry corresponding to said second file” as recited in Applicant’s claim 21.

Thus, neither Christiansen nor Napolitano, teach or suggest the combination of features as recited in Applicant’s claim 21.

Accordingly, Applicant respectfully submits that claim 21, along with its dependent claims, patentably distinguishes over Christiansen and over Christiansen in view of Napolitano.

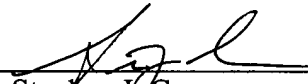
Likewise, claims 26, 31 and 40 recite features similar to claim 21. Thus, Applicant believes that claims 26, 31 and 40, along with their respective dependent claims, patentably distinguish over Christiansen and over Christiansen in view of Napolitano for at least the reasons given above.

CONCLUSION

Applicant submits the application is in condition for allowance, and an early notice to that effect is requested.

If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5181-59200/BNK.

Respectfully submitted,



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